

Mirco-Hydroelectric Project

Pico hydro project -Thima Site

Area of coverage	<ul style="list-style-type: none"> The scheme serves 165 households dotted within an area of 1000m²
Source of water	<ul style="list-style-type: none"> River Rutui, near kerugoya town. The river has a flow rate of more than 100l/s during 90% of the year
The Average cost	<ul style="list-style-type: none"> Ksh.720, 000. Community contributed over half of this money, transmission poles and labour. The average cost per household is \$58
Scheme output	<ul style="list-style-type: none"> 2.2kw with shaft extension of 3.3kw. The electrical output of 2.2kw corresponds to a turbine-generator efficiency of 45%
Technical Summary	
Head	<ul style="list-style-type: none"> The net head is 18 metres and flow into the turbine is 28 l/s
Intake	<ul style="list-style-type: none"> The intake is more than 80m³ water storage. The water source is small spring, with flow rate of 5 litres per second.
Penstock	<ul style="list-style-type: none"> The Penstock is 90 metres length, 160mm diameter and made of PVC pipes. The flow rate into turbine is 8.4 liters /second
Turbine	<ul style="list-style-type: none"> The scheme uses water pump as turbine directly coupled to a generator.
Power house	<ul style="list-style-type: none"> This building houses the pump-as-turbine and generator equipment and ensures that the water is returned directly to the river. It is built above flood level but otherwise close to the riverbank. The location was chosen to maximise the available head whilst minimising the penstock length. A draft tube was added to the outlet of the pump to obtain an extra 1metre of head. Extra floor area was added to the building since the intention is to use the far end of the generator shaft to drive a 'posho' (maize) mill. Double-ended generators such as this can
Generator	<ul style="list-style-type: none"> The scheme uses an induction <i>motor-as-a-generator</i> and produces about 2.2 kW. but a shaft extension provides a 3kW drive for mechanical loads. The generator output is regulated by means of an induction Generator Controller to control voltage and frequency.
The Ballast	<ul style="list-style-type: none"> Excess power is fed to a ballast load. Two 1.8kw cook rings were used for that.
Transmission and distribution system	
Cables	<ul style="list-style-type: none"> Single -phase distribution system with insulated copper conductors. The transmission and distribution lines comprised of multi-stranded and insulated copper wires of 6mm² (transmission) and 2.5mm² (distribution) lines respectively.
Poles	<ul style="list-style-type: none"> Poles measuring 25ft and a diameter of 6 Inches at the base and placed between 30 -45 meters apart. Both poles were acquired locally. Poles mostly from Eucalyptus Species.
House wiring/Tariffs	<ul style="list-style-type: none"> Household use 8w energy saving bulbs There is a socket to run appliances Household pay between Ksh.100 -150 per month for power used. The household are fitted with
Beneficiaries	
Households	<ul style="list-style-type: none"> 165 households within an area of radius of 1000M² are connected to the generator Each house has 230V supply, sufficient one/two energy saving lamps and a radio socket. 8 watts energy saving bulbs are used.